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Understanding Victimization: The Case of Mozambique

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Summary. – This paper analyzes how different economic characteristics at the individual, household and community level affect the risk of victimization, controlling for the impact of (non-economic) sociological factors. We use a nation wide household survey from Mozambique and show that the probability of being victimized is increasing in income, but at a diminishing rate. At the same time, poorer households are vulnerable. While less at risk of victimization, they tend to suffer relatively greater losses when such shocks occur. Economic development and reduction in victimization go hand in hand, and lower inequality and increased employment appear as effective means of combating crime.

Keywords – Victimization, Crime, Africa, Mozambique, Development, Probit

JEL classification: K40, K42, O55

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1. INTRODUCTION

This paper is a contribution to the literature on the socio-economic determinants of victimization. Crime is rightly perceived as a critical constraint on economic development, and the many ways in which crime and insecurity affect human welfare are aptly summarized by Fafchamps and Moser (2003). Consequently, formulating comprehensive and effective policies to combat criminal behavior and minimize victimization appears as an area with potentially very high social and economic returns. This is certainly so in Mozambique. In spite of recent economic growth, Mozambique remains one of the poorest countries in the world and this war- and drought-stricken southern African country continues to suffer from a particularly violent economic and political history with roots going back to an extreme case of colonial domination and exploitation. Misguided economic policies in the immediate post-independence years added further complications, and the apartheid regime in South Africa violently undermined the development efforts of the 1980s.

A first aim of our paper is to provide a 'map' for identifying individuals with the highest risk of being subjected to crime of different kinds in Mozambique and to identify appropriate policy measures, or at least broad areas, where policy action appears to be effective in curtailing crime. In this part of our analysis, we look at the risk of being victimized due to property crimes and physical assaults of various kinds. We subsequently look more narrowly at how income and the economic loss from property crime are related at the household level. Some 90% of those victimized in our data suffered a property loss, and we ask more specifically whether relatively well off households are victims of minor property crimes and poor households are victims of economically more disruptive crimes.

Our venture is not an easy and straightforward task. Data from the Mozambican Ministry of the Interior (2004) suggest that 39,061 and 40,630 criminal offences of different types took place in respectively 2002 and 2003 in the whole of Mozambique. With a population of around 18 million this suggests that around two people in every thousand are victimized every year. In contrast, the following illustrative victimization statistics are reported in a survey of 2,874 individuals in the city of Maputo and the

provinces of Maputo, Sofala, Zambezia and Nampula:[1] Burglary (40.3%), robbery (17%), theft of personal goods (31.9%), sexual offenses (4.3%), and assault/threats (15.3%). While the sample in question can hardly be described as representative,[2] and while the stated intention was to capture all criminal events recalled by the interviewees, these data nevertheless paint a much more serious picture than the officially reported data. This is so in particular when it is noted that half of all the crimes reported in the survey concern 2002. This is put in further perspective when it is noted that the following shares of crimes were *not* reported to the police: Burglary (73.4%), robbery (78.4%), theft of personal goods (85.9%), sexual offenses (75.2%), and assaults/threats (74.6%).

In sum, while officially reported criminal statistics do exist in Mozambique, they are not representative of the 'true' criminal situation. Alternative sources of data have to be relied on in careful policy relevant research efforts. Here we are fortunate that a nationally representative household survey was conducted in Mozambique during 2002 and 2003. It included a novel section on victimization on which the empirical section of this paper is built. Relying on a nationally representative survey (rather than officially reported criminal statistics) where information is available at the level of individuals and households is a potentially very rewarding research avenue to improve our understanding of victimization in developing countries.

When turning to the question of which determinants of crime and victimization to include in empirical analysis, economic theory calls attention to offender motivation and behavior. In such attempts to explain crime, focus has therefore generally been on how the offender perceives the optimal balance between gains from criminal activity, on the one hand, and associated constraints and risks (i.e. the risk of getting caught and the punishment involved), on the other. This suggests that the probability of being a victim can be expected to be a positive function of indicators related to income, i.e. individual income, education, and employment status as well as to the severity and effectiveness of the punitive actions taken by society.

In contrast, sociological studies have in their theories of criminal victimization emphasized victim behavior and characteristics. The most prominent perspectives in this group are the 'lifestyle exposure' and 'routine activities' theories. Putting victim

behavior at the center of attention, these approaches yield different policy implications as compared to their economic counterparts. A second main aim of the present paper is on this background to develop a unified analysis where both economic and sociological factors are 'allowed to play their part'.

The paper is organized as follows. Section 2 surveys existing economic and sociological literature in more detail with a view to identifying in an organized manner a relevant set of specific determinants of victimization to be included in the empirical analysis. This is followed in Section 3 by an overview of our empirical methodology as well as the data used, together with some descriptive statistics. Section 4 presents results, while Section 5 looks into robustness. Section 6 concludes and outlines policy implications.

2. LITERATURE REVIEW

Gaviria and Pàges (2002) confirm in their recent review that economic theories of crime typically focus on the incentives of offenders as the key approach to explaining criminal events. For example, Becker (1968) and Ehrlich (1973) suggest that criminal acts can be viewed as being directly linked to rational decision making by the offender. He/she carries out an *a priori* cost-benefit type analysis, where perceived costs and benefits at the individual level are weighed against each other. Subsequent action is decided on this basis. In contrast, in traditional sociological models victim behavior is at the core, and limited attention is paid to factors associated with offender motivation and perception.

Existing literature reveals with some notable exceptions a lack of attempts at trying to integrate economic and sociological perspectives.[3] Our point of departure is that this is unfortunate and we suggest that economic variables should be considered alongside their sociological counterparts. Only in this way can more comprehensive and satisfactory analyses, geared towards identifying which individuals are most likely to be victims of criminal acts, be developed. In what follows we summarize existing analytical frameworks and their implications in order to identify and justify which variables should enter into our unified framework.

Meier and Miethe (1993) conclude that the two most advanced sociological theories of victimization are the 'lifestyle-exposure perspective' and the 'routine activities theory'. Hindelang et al. (1978) were among the first proponents of the lifestyle-exposure approach. They suggested that differences in the likelihood of being a victim can be explained by differences in the lifestyles of the potential victims. More specifically, their theory predicts that individuals, who are younger, male, unmarried, and have low income, experience higher risks of being a victim. This is so because this group of people is observed to be more active in the public domain, and they use less time within the family and associate themselves more frequently with individuals with criminal tendencies.

The routine activity perspective was developed by Cohen and Felson (1979), and it is in many ways quite similar to the lifestyle-exposure approach. Meier and Miethe (1993) argue that the key difference is that the routine activity perspective was created to account for changes in crime rates over time. In contrast, the lifestyle-exposure approach was developed with a view to capturing differences in victimization risks across social groups. From the routine activity perspective, non-household activity increases the probability of victimization by making individuals more visible and accessible to crimes. The attractiveness of individuals and their associated properties also play an important role in increasing the risk of victimization, but higher levels of self-protection or guardianship will in this perspective decrease individual risk.

Cohen *et al.* (1981) analyze the question of victimization within a routine activity type framework focusing on the mediating role played by four factors: Exposure, guardianship, proximity to potential offenders, and attractiveness of potential targets. Definitions of these four factors are listed in the Appendix, and in Table 1 we have categorized the list of variables used in our empirical analysis in accordance with the Cohen *et al.* (1981) classification.[4]

[Table 1 about here]

The routine activity model predicts that increased exposure will *ceteris paribus* lead to an increase in victimization risk. This is supported by empirical observation.

Both economic (Fajnzylber *et al*., 2002 and Gaviria and Pàges, 2002) and sociological (see Meier and Miethe, 1993 for an overview) studies consistently show that young, single, employed males without children have higher probability of being victimized than their demographic counterparts. This is regardless of whether the analysis is carried out at the individual or at the household level.

According to lifestyle theories greater guardianship should decrease the risk of victimization. However, the empirical evidence is somewhat mixed. This is at least how Smith and Jarjoura (1989) interpret available evidence, noting that the burglary risk decreases with household size. In contrast Gaviria and Pàges (2002) conclude that larger families have higher, rather than lower, probabilities of being victimized. Another measure of guardianship used in the literature is distance to local police stations (see Table 1 and Zenou, 2003). Fajnzylber *et al.* (2002) find a positive relationship between their police guardianship variable and the probability of being robbed, but it cannot be excluded that this reflects causality potentially running from robbery rates to distance to police.

It is to be expected that the closer people reside to relatively large groups of motivated offenders, the greater is the risk of victimization. This is supported by the empirical evidence of Meier and Miethe (1993). People living in larger urban areas are in this perspective more exposed to crime, a finding which has however been challenged by Fafchamps and Moser (2003) in the case of Madagascar. Here crime and insecurity is associated with isolation, not urbanization. Moreover, it is often argued that individuals living in areas with high unemployment rates are at a greater risk of becoming a victim. This corresponds with the results obtained by Cohen *et al.* (1981), who note that the risk of being victimized increases in poorer neighborhoods. This is in line with Bourguignon *et al.* (2003), Demombynes and Özler (2005) and Soares (2004). They consider the effects of inequality on crime, and find that income inequality affects crime rates positively.

Soares (2004) finds that education reduces crime, whereas Gaviria and Pàges (2002) suggest that education increases the risk of being victimized. Generally the effects of education on the risk of being a victim have varied from study to study and from country to country. A clearer picture emerges when attention is on perceived

safety of the immediate neighborhood and measures of the perceived quality of the local police and the justice system. These variables go hand in hand, and Gaviria and Pàges (2002) argue for a causal link from low confidence in the police to higher victimization rates, suggesting that the incidence of crime and perceived safety may be linked.

Finally, if crime is motivated by instrumental ends, as suggested by economic theory, it is generally expected that the greater the attractiveness of a target, the greater the risk of victimization. However, the effect of income on victimization risk is probably highly dependent on the nature of the crime as noted by Cohen *et al.* (1981). They show that in terms of assaults, higher income lowers the probability of being victimized. This is due to the fact that the proximity, exposure and guardianship effects seem to dominate increased attractiveness caused by higher incomes. Income also appears to have two opposing effects on burglary victimization risk, and according to Cohen *et al.* (1981) it is not clear whether proximity, exposure and guardianship will dominate the influence from increased attractiveness in this case. Finally, according to the routine activity approach personal larceny victimization risk will always be increasing in income.

Summing-up, Smith and Jarjoura (1989) argue that sociological theory leads to differing conclusions about the effect of income on victimization risk. Moreover, most empirical studies find that the probability of being victimized is increasing in income. This is consistent with economic theory, where the probability of being a victim is a positive function of indicators related to individual income, regardless of the type of crime. Yet, burglary rates have been found to be negatively related with income, and other studies such as Smith and Jarjoura (1989) refer to a parabolic relationship between income and victimization, where the poorest and the richest have larger probabilities of becoming victims. Another attractiveness variable that is often seen in the literature is whether the individual or household owns expensive and portable consumer goods. Results regarding this variable have also been somewhat mixed. Furthermore, whether more economic resources allow individuals to more easily avoid risky and vulnerable situations or whether increased earnings attract more criminals, and thus the probability of becoming a victim, is not obvious regarding all types of criminal acts.

While the sociological and economic literature offer somewhat different underlying explanations of the causal links behind victimization, it is on the above mixed background equally clear that contradictory conclusions about the effects of specific economic and sociological variables (such as income) on the probability of becoming a victim are widespread. We therefore go on to analyze how different economic characteristics at the individual, household and community level affect the risk and loss of victimization in Mozambique within a unified analytical framework where we control explicitly for sociological non-economic factors.

3. METHODOLOGY, DATA AND DESCRIPTIVE STATISTICS

Based on the literature survey in the previous section we take a reduced form approach to modeling the probability of an individual being victimized. Formally,

$$\Pr(y_{ijc} = 1 \mid x_{ijc}, z_{jc}, q_c) = f(x_{ijc}, z_{jc}, q_c, e_{ijc}) \qquad (1)$$

where y_{ijc} is an indicator variable showing whether an individual *i*, who is a member of family *j* that lives in community *c*, was a victim of crime. The dependent variable takes on a value of one if the individual was victim of a crime and zero otherwise. x_{ijc}, z_{jc}, q_c are vectors of respectively individual, household and community characteristics, whereas ε_{ijc} is an individual error term. We also estimate (1) at the household level; the dependent variable y_{jc}^{h} indicating whether any member of the household was victimized.

We use a probit model as our preferred specification, and interpret (1) as derived from an underlying latent variable model. In this model, we assume that $y_{ijc} = 1[\alpha_0 + x_{ijc}\alpha_1 + z_{jc}\alpha_2 + q_c\alpha_3 + e_{ijc} > 0]$ with e_{ijc} being normally distributed. In Section 5 we test the robustness of our results with respect to specification of the functional form and the variables included.

In the analysis of the relative loss from property crimes at the household level we utilize Heckman's selection framework. For household *j* the relative loss, l_{jc}, can be expressed as:

$$l_{jc} = \beta_0 + z_{jc}^{*h}\beta_1 + q_j^{*h}\beta_2 + u_{1j} \qquad (2)$$

where superscript **h* indicates that the vectors z_{jc}^{*h} and q_j^{*h} are not necessarily identical to their counterparts in the household level version of (1). A loss is only observed if:

$$\gamma_0 + z_{jc}^{h}\gamma_1 + q_j^{h}\gamma_2 + u_{2j} > 0\,,\ (u_{1j}, u_{2j}) \sim binorm(0,0,\sigma,1,\rho) \qquad (3)$$

Equation (3) is our selection equation, and it is the household level equivalent of the underlying latent variable model above. Note that the samples used in estimating (1) and (3) differ. Households, who suffer a loss, are a subset of all households victimized.[5]

In all estimations, appropriate household weights are used, taking into account the survey design (i.e. stratification of the survey sample and the clustering of enumeration areas).

The data come from a nationally representative household survey (IAF) conducted in Mozambique during 2002 and 2003 by the National Institute of Statistics (INE). The survey took place over the space of a year, beginning in July 2002 and ending in June 2003. Data collection was carried out in clusters of nine and 12 households in respectively rural and urban regions using a stratified sampling process with 21 strata (consisting of 10 provinces, each divided into a rural and an urban zone, plus Maputo city).[6] A total of 858 clusters make up the sample of 8,700 households. After data collection, INE constructed household weights so as to ensure that the sample is representative at the national, regional and rural/urban levels in accordance with the 1997 census.

The survey contains detailed information on individual characteristics including victimization entries on robbery, assault and larceny for around 43,000 individuals distributed among the 8,700 households. The survey instrument also includes questions on general characteristics of the individual and the household (including whether or not

individuals have been victimized), daily expenses and home consumption, possession of durable goods, gifts and transfers received. Other expenses, which tend to occur with lower frequency than daily expenditures, such as school fees or purchases of clothing are covered as well. Additional details on the survey can be found in MPF *et al.* (2004). Full documentation of all aspects of the 2002-03 IAF survey is available in Portuguese from the National Institute of Statistics (INE, 2004).

In our analysis we consider individuals aged 12 and above, but variables measured at the household level include information on the complete household, i.e. including members aged less than 12 years. A number of households had to be excluded due to missing information, so our final sample consists of 24,752 individuals distributed among 7,339 households.

The questionnaire includes a novel and detailed section on victimization of each member of the family as well as related questions at the household level. These are the data on which we focus in this paper, and by way of background, we note that 6.4% of the respondents are of the view that criminal offenses are the main social problem in Mozambique at the moment. Moreover, 19% of the households answered that crime in their residential area had increased during the past 12 months. About half of the households in our sample felt unsafe when walking alone at night, even though only around 27.5% of the households have experienced a household member being victimized. Table 2 gives an overview of the types of crimes faced by the households. About two-thirds of the crimes can be characterized as some kind of theft or robbery, whereas rape, other sexual abuse, assault and domestic violence account for 4.8%. Interestingly, bribery does not come across as particularly serious in Mozambique.

[Table 2 about here]

From Table 2 it is also clear that most offences happen within the household premises. One third of crimes take place in the public domain, including in particular on roads (8.9%), in the market (3.2%) and at work (3.2%).

The literature survey in Section 2 identified a number of potential determinants for being victimized, and information on these determinants can be obtained from the

IAF survey questionnaire. The variables used in the analysis are listed together with descriptive statistics in Table 3 at the individual and at the household level. Most variables come straight out of the survey, but a few had to be constructed as explained below. To ease our brief overview of the determinants, they are grouped according to the classification in Table 1.

[Table 3 about here]

The first set of determinants considered is those in the exposure group, including gender (individual and household head), age (individual and household head), employment status (individual and household head), and marital status. At the individual level, 53.0% of the sample consists of women, but only around 22.8% (26.4% measured at the household (HH) level) of individuals has a woman as household head. The average age of individuals is 31.0 years, and for household heads this figure is 45.3 (43.1 years measured at the HH level). As already pointed out in Section 2, employment status is potentially an important determinant of victimization. At the individual level, 12.4% of the sample is registered as being without work, and for household heads this figure is 9.3%. This corresponds with the average for sub-Saharan Africa and the information on Mozambique in WDI (2003). The final determinant at individual level in the exposure group considers the marital status of the individuals. Married or cohabiting partners make up 51.0% of the sample, 37.4% are single and the rest are either divorced or widowed.

The second group of determinants includes guardianship characteristics, such as household size, family composition (share of adult males over the age of 18 in the household) and household distance to a police station. The average household size in the sample is 6.4 individuals (5.1 at the household level), and the adult male share is around 24.6%. Distance to the police station is reported by the household as a categorical variable corresponding to different lengths of time it takes to reach the nearest police station. A third of the population has less then half an hour to the nearest police station by foot, but variation is large and 23.4% of the sample has more than a 120 minutes walk to the police.[7]

Proximity determinants such as education and the community variables are listed in the third group. Measures of the individual level of human capital, i.e. education, is represented by five dummy variables.[8] At the level of the household head, education level is measured by a categorical variable with values from zero to four, constructed from the five dummy variables at the individual level.[9] Some 23.8% of the sample has no education at all, and in general the educational level is as expected quite low. The next variable in the proximity group is the community unemployment rate, which is constructed from the survey data. It is measured at the district level (a geographical and administrative unit below the province level) by looking at the share of adults aged 18 years and above, who stated in the IAF that they did not have work and were not studying. With a mean unemployment rate of 16.4%, this community indicator is above the individual unemployment level referred to above.

Turning to inequality at the district level we use the Gini-coefficient of real expenditure (i.e. spatially and temporally deflated) extracted from the survey data.[10] The Gini-coefficient in our sample is 0.39. This is around the average for sub-Saharan Africa (WDI, 2003), and the reported 0.40 for Mozambique in 1997. The average population density is also recorded at the district level and is based on the 1997 census. In the sampled areas the average population density is around 1,278 persons per square kilometer. As a crude proxy for how integrated each community is we use the information in the 1997 census on the number of foreigners living in each district to form the share of foreigners in total district population. The average share of foreigners in our sample is quite low at 1.8%.

Finally, descriptive statistics concerning the characteristics related to the attractiveness of the individuals (income and possession of durable goods) are given. The average monthly individual (nominal) income is 0.93 million Meticais (36.6 US$).[11] At the household level the (real) annual income (i.e. consumption) per person is on average 14.5 million Meticais (571 US$), which as expected is somewhat above the GDP per capita of 212 US$ in 2000 reported in WDI (2003). Last, possession of durable goods, which makes individuals more prone to being a victim, is measured by household dummy variables for having at least one TV, radio and bicycle in the

household. Around half of households own a radio, whereas bicycle and TV ownership is more limited at 26.5% and 13.0%, respectively.

4. RESULTS

Some 27.5% of the households in our sample and 9.0% of people at the individual level experienced as shown in Table 3 one or another kind of criminal act(s) during the past 12 months according to the Mozambican IAF.[12] At the individual level, the 9.0% were victimized at least once during 2002/03, but only 1.3% of the 24,752 observations were physically assaulted. Most of the crimes registered in the survey were burglaries (5.7%), whereas cases of larceny were reported for 2.8% of the sample.

(a) Determinants of Victimization

Tables 4 and 5 present the main findings of our econometric analysis of the probability of being victimized (marginal effects at the mean of the data); and the discussion in what follows is organized in accordance with the four groups of determinants identified in the literature survey in Section 2. We start with the attractiveness and end with the exposure variables. The first regression, column (1), in Table 4 is the baseline formulation at the individual level including the 24,752 observations; the second regression, column (2), only considers individuals earning a positive income; and the third regression, column (3), shows results of the analysis at the household level. Table 5 disaggregates victimization into three categories, burglary, assault, and larceny.

[Table 4 about here]

(i) Attractiveness

There is a statistically significant indication in the data of individual income being positively related to the probability of being victimized, in line with most studies on victimization. This holds in all regressions in Tables 4 and 5 except for, column (3)

(Larceny) in Table 5. Moreover, results from column (2) in Table 4 and from column (1) in Table 5 suggest that there exists a non-linear relationship between income and victimization. The probability of being victimized, and especially burglarized, is in Mozambique increasing in income, but at a diminishing rate. These results confirm Cohen *et al.* (1981), who concluded that the effect of income on victimization risk is highly dependent on the nature of the crime. The overall picture of the effects of income on victimization does not change when the analysis is carried out at the household level.

[Table 5 about here]

Possession of durable goods is another attractiveness variable considered in the literature on victimization. Our data suggest that household ownership of a bicycle increases the probability of being victimized. However, when disaggregating victimization by types of crime, the positive significance of this relation is only retained in the assault regression. It is of course difficult to perceive of bicycle ownership as purely an attractiveness variable, and we believe this result is due to the fact that bicycle ownership also proxies for how much time individuals spend away from the immediate neighborhood. It implies that this particular result is probably more due to exposure associated with bicycle ownership overriding the effect from the attractiveness dimension.

(ii) Proximity

Turning to the second group of determinants (proximity characteristics) it appears that individuals, who are educated (measured vis-à-vis those without any education), are more likely to be victimized (except for assaults). This is in accordance with Gaviria and Pàges (2002) and seems to reflect that being educated transmits a signal of being a more attractive target of crime, controlling for other factors of influence. Unemployment at the macro level tends to increase the individual probability of being victimized, and the results in Table 5 confirm this for the various types of crime.

Consistent with Bourguignon *et al.* (2003) and Soares (2004), we find indications of a positive relationship between inequality and the risk of victimization in Table 4, but when disaggregating by type of crime the relationship between inequality and assaults as well as burglary turn out insignificant. That is, victimization in terms of larceny is sizeable, significant (at the 5% level) and positively related to income inequality whereas the relationship turns both insignificant (for assaults and burglary) and of much smaller size (for assaults). Moreover, the level of educational attainment of the household head, population density and the share of foreigners in a community (integration) do not seem to significantly influence the risk of being victimized in Mozambique at the individual level.

(iii) Guardianship

Looking at guardianship characteristics, it is clear that household size yields different results depending on whether the analysis is done at the individual or at the household level. At the individual level, household size is significant and negatively related to victimization in accordance with typical lifestyle theories. Family members tend to look after each other and the household serves as a network of protection (Fajnzylber *et al*., 2000). We find a positive and weakly significant relationship between household size and victimization at the household level. This suggests that the greater exposure of having more members has a stronger effect than the guardianship effect.

A larger share of adult males in a household seems to reduce the risk of becoming a victim, and according to Table 5 this is especially so for burglaries. Distance to the police station might be expected to have an effect on the probability of criminals being caught and therefore on the risk of victimization. However, coefficients do not depict a clear picture, except that when distances are large, the risk of victimization decreases. Reverse causality may be at play, i.e. police stations may be placed where criminal rates and the risk of victimization is higher, but our results correspond with the findings in Fajnzylber *et al*. (2000) for Latin America. They also seem to suggest that the Fafchamps and Moser (2003) result for Madagascar where crime increases with distance to urban centers does not hold in the case of Mozambique.

(iv) Exposure

Finally, determinants describing exposure generally have a significant influence on the probability of being victimized. Our results confirm that males have a higher probability of being victimized than females, and being a young person living in households with an older household head reduces the risk of victimization. Single people are less victimized than their marital and divorced counterparts in Mozambique, an opposite result of what is normally found in the literature (Fajnzylber *et al.*, 2000). Yet, our result holds for all types of victimization, indicating that it is a common characteristic of the Mozambican case.

(b) Economic Loss from Victimization

As a measure of the severity of economic loss due to victimization (caused by property crimes, but excluding assaults), we use the logarithm of the ratio of monetary loss to yearly household income. For the 1,920 households with economic loss due to crime the mean ratio is 2.1% of yearly household income. A few observations exist with very high loss ratios (i.e. greater than 100% of yearly income). Although, these observations are outliers we include them in the analysis since leaving them out has no effect on the estimates of the effect of household income on relative loss.[13] We are particularly interested in the relationship between relative loss and household income and therefore include household income and household income squared as explanatory variables together with household level variables included in Table 3 – except distance to police station. In the robustness analysis we show that the coefficients on income and income squared are not sensitive to which other explanatory variables are included. The selection equation is the same as the household level probit regression reported in Table 4.

Table 6 presents the results when controlling for selection and – for comparison – without controlling for selection.

[Table 6 about here]

The test for dependent equations reported in Table 6 illustrates the need for using a selection equation framework. Our interest centers on the estimates of the income terms. The convex relationship has an estimated turning point of around 400 million Meticais. This means that for all but a few households, the expected marginal loss ratio is decreasing in income. Poorer households, though less at risk of being victimized, lose a relatively large share of their income when they are victimized. This highlights that the vulnerability of the poor is also in this area of social and economic life a dimension that deserves careful attention by policy makers. Helping combat crime is of particular importance to the poorest which are hardest hit, in relative terms.

5. ROBUSTNESS ANALYSIS

In this section, we analyze the robustness of the results presented in Section 4. For the probability of being victimized we look along several dimensions. First, we take an informal look at the extent to which our results are driven by the chosen functional form, i.e. the probit model. We secondly proceed to investigate how the results are affected when one or more of the variables previously identified as potential determinants of victimization are omitted. In an analogous way we then turn to investigating whether our results on the relation between economic loss from victimization and income are robust to changes in the specification. Finally, using the household level framework we check whether our results suffer from endogeneity problems related to the income variable. Such endogeneity could potentially arise if victimized people would alter their behaviour significantly due to victimization and the related economic losses.

[Table 7 about here]

Table 7 shows for comparative purposes marginal effects evaluated at the mean of the sample for respectively the logit and the linear probability model together with the probit model (Table 4). It is comforting that the sign of the coefficients do not differ qualitatively among the three models for any individual variable. The differences in the

marginal effects between the probit and logit model are in general quite small, and this is especially so when we consider significant variables only. The linear probability model suggests a 3-4 times larger marginal effect of individual income and individual income squared (in numerical terms); but this difference largely disappears if the sample is restricted to individuals with positive income (not shown). Consequently, this change can be attributed to the methodological difference in treatment of zero income observations between the logit/probit and the linear probability model. The employment status of the household head and the integration variables show large absolute differences. However, none of these variables are significant.

We now turn to the robustness of the results to omission/inclusion of different variables. Following the literature on extreme bounds analysis, we run a systematic series of probit regressions to assess the sensitivity of the estimated coefficients to omission of specific groups of variables. Specifically, we divide the variables of Table 7 into two groups. One group contains what we denote as core variables. These are included in all subsequent regressions. The remaining variables belong to the second group – denoted secondary variables. The victimization dummy is then regressed on all possible linear combinations of the secondary variables including, in all the regressions, the full set of core variables. In other words, if the group of secondary variables is said to consist of k variables we perform 2^k-1 regressions.

The selection of core variables can of course take different directions. Yet, our main focus is on how individual and household characteristics affect the probability of being victimized. We therefore include as core variables all individual and household characteristics, excluding the three dummy variables indicating household possession of durable goods (due to their insignificance) and the distance to police station dummies because of the possible endogeneity mentioned above. This implies that the group of secondary variables is made up of 12 variables: Possession of durable goods (three variables), distance to police station (four variables), unemployment rate, inequality, average level of educational attainment, population density and integration.

[Table 8 about here]

Table 8 shows the summary statistics from this analysis. The first three columns show the maximum, minimum and average of the point estimate over all possible regressions discussed above. Column (4) shows the average standard deviation of the point estimates. Columns (5) to (7) contain the main results from the analysis. They reflect respectively the share of regressions where the point estimate is significant at the 5% level, the share with a positive point estimate (not necessarily significant), and finally the share of regressions with a negative point estimate. Column (8) gives the average *t*-value over all regressions.

The core variables are remarkably robust. None of them change sign in any combination with the secondary variables, and except for individual income squared, education and age of household head they are always significant at the 5% level. The square of individual income is 'on average' significant at the 10% level. Regarding the secondary variables the results are more mixed. Only the dummy variable indicating the longest distance to a police station is significant in the regressions, although the other distance dummies have the same sign in all regressions. However, the two variables reflecting possession of a radio and a bicycle, the unemployment rate, inequality, population density and integration all consistently retain the same sign in all regressions. The average level of educational attainment and possession of a TV are the only other variables where the point estimate switches sign depending on which secondary variables are included in the regression.

Turning to the robustness of the economic loss from victimization we use a similar methodology. More specifically – in light of our findings above – we retain the same selection equation (3) in all the regressions. For the regression equation (2) we use the variables of primary interest, income and income squared, and household size (due to its high significance, see Table 6) as core variables. The group of secondary variables consists of gender, age, education (four variables), employment and the share of adult males at the household level, and possession of a TV, radio and a bicycle. Proceeding as described above leaves us with 2,047 regressions.

[Table 9 about here]

Table 9 summarizes our findings for the three core variables.[14] As is evident from Table 9 the coefficient estimates of the income terms are very robust with respect to the specification of the regression equation. In all regressions, they are clearly significant and the variability between regressions is small.

Finally, Table 10 summarizes our analysis of the potential endogeneity of the income variable referred to above. We restrict the analysis to the household level,[15] and in our estimations we instrument household income using two types of housing characteristics: The number of rooms in the main premises, and a dummy variable for whether the house is built by brick or not.

[Table 10 about here]

The IV probit and the 2SLS coefficients associated with household income in Table 10 are always higher than the corresponding probit/OLS estimates. This suggests an endogeneity bias. However, the Wald test for exogeneity shows that the hypothesis of household income being exogenous cannot be rejected at conventional significance levels. Note moreover that all our instruments are valid. The Hansen J-statistic (test for over-identifying restrictions) indicates validity, and the tests for excluded instruments (first-stage) indicate strong partial correlations in all first-stage regressions. Looking in more detail at Table 10 shows that only household gender, distance to police station and inequality (only in the linear probability model) turn insignificant. Summing up, our robustness analysis confirms that the victimization patterns revealed in Section 4 are both credible and robust.

6. CONCLUSIONS

This paper departed from the observation that economics and sociology point in somewhat different directions when trying to understand victimization in developing countries. Economics suggests that focus should be on the potential offenders and their evaluation of costs and benefits of antisocial behavior. This implies, for example, that higher incomes among potential victims are, *ceteris paribus*, expected to lead to more

crime. Sociology, on the other hand, has been more concerned with the characteristics of potential victims, including in general a more complicated set of explanatory categories. This approach has, however, been hampered by inadequate attention to variation by type of crime, poor links between theory and data, inadequate measures of key concepts and failure to specify clear functional forms of the relationship between various sets of variables (Meier and Miethe, 1993). Causal relationships have, in other words, generally not been clearly uncovered following this approach.

While the sociological approach may to some reflect an idea that "smacked of 'blaming the victim'" as formulated by Meier and Miethe (1993), it is equally correct that the economic approach may suffer from its trying to move forward on one leg only, ignoring that there is need to control for sociological variables before conclusions are drawn up. On this background, we proceeded to studying victimization in the case of Mozambique, relying on a unified analytical framework where both economic and sociological dimensions are allowed to speak in the analysis. The choice of country case is justified both with a view to the fact that Mozambique belongs to the category containing the poorest countries in the world and because a novel and revealing, nationally representative household survey with relevant information on victimization at the individual and household levels has recently become available.

Our econometric analysis uncovered a set of remarkably robust conclusions. They include in particular:

- The probability of being victimized is increasing in income, as suggested by economic theory, but at a diminishing rate. Economic development and reduced crime rates can be expected to go hand in hand.
- Inequality and higher unemployment increase crime. Targeted policies geared towards employment creation and limiting inequality are likely to counteract criminal behavior, as a positive externality to the desirability of these aims in their own right.
- Increases in education do not appear to reduce crime by themselves. Any effects from better education seem to operate through reduction of inequality and generating higher incomes. Avoiding increased inequality and promoting

development, rather than promoting education *per se*, should be the focus in public policy, if avoiding crime is given high priority.

- Guardianship is indeed important as proposed by sociological studies. Both household size and the share of adult males in a household reduce the risk at individual level of becoming a victim. The implication is that policies, focused on promoting networks and social cohesion, are an effective way of helping to counteract crime.
- While poorer households are less likely to be subjected to crime they tend to suffer greater relative losses. Vulnerability of the poor is also in this area of social and economic life a characteristic that merits careful attention by policy makers as well as further study. The poorest are clearly the ones who will find it harder to afford the consequences of shocks, but they are those who are hardest hit by crime in relative terms.

In sum, it is possible to increase our understanding of victimization following the advice of Meier and Miethe (1993) of incorporating sociological victimization theories into a unified theory of crime where functional relationships are clearly specified. Robust patterns do emerge among key variables, which can help bring the policy formulation process on a solid foundation. In parallel, our study confirms that it is insufficient to focus on offender motives only. Sociological insights should be drawn upon alongside economic theory in coming up with a coherent understanding of victimization.

NOTES

[1] The survey was carried out by the Population Studies Center (CEP) at the University Eduardo Mondlane under the so-called Strategic Planning for the PRM, see Populations Studies Center (2002). The statistics reported here are from the report on the results of the survey (i.e. report no. 1).

[2] It is clear in Mozambique that crime is more prevalent in the city of Maputo than elsewhere and the same goes in all likelihood for the provinces in question. This certainly does not imply that crime is 'rare or even non-existent' in rural areas in Mozambique as will become clear in this paper. See Fafchamps and Moser (2003) for a study of Madagascar where crime is found to increase with distance from urban centres, when controlling for population composition and risk factors.

[3] See Fafchamps and Moser (2003) and Demombynes and Özler (2005) for two recent studies where a broad range of explanatory variables are relied on in explaining crime in respectively Madagascar and

South Africa. While these two articles study crime we focus in this paper on the other side of the criminal event, victimization.

[4] We recognize that placing education in the proximity category can be debated. However, we follow Cohen *et al.* (1981) and Meier and Miethe (1993) to ensure as high a degree of comparability as possible.

[5] Of households being victimized 90.2% suffered a property loss. We highlight that it is only these 90.2% of the victimized, who enter the selection equation (3). The welfare loss suffered due to non-property crime can of course be substantial, but an analysis hereof is well beyond the scope of the present paper.

[6] Mozambique has 10 administrative provinces (Cabo Delgado, Niassa, Nampula, Sofala, Zambézia, Manica, Tete, Gaza, Inhambane and Maputo) in addition to Maputo city.

[7] The categorical values correspond to the time it takes to reach the police station on foot: 1 = 0-29 min.; 2 = 30-44 min.; 3 = 45-60 min.; 4 = 60-119 min.; 5 =120+ min. When answering the question on distance to the police station households could choose mode of transportation, thus, for some household the distance on foot had to be constructed. This was done by giving all household that answered the question with a mode of transportation different from 'on foot', the average of the categorical variable over the households in the same enumeration area that answered the question giving the length of time 'by foot''. It was not possible to recover the length of time to the nearest police station on foot for approx. 900 household, however, replicating our analysis including these household (and excluding dummies for distance to police station) yields qualitatively the same results as those presented here.

[8] Educ0 = Never went to school; Educ1 = Went to school but no grade obtained; Educ2 = literate and primary 1st completed; Educ3= primary 2nd completed; Educ4 = higher and technical educations.

[9] Thus, average education is calculated as (# of persons with edu0=1x0 + # of persons with edu1=1x1…)/# of persons.

[10] See MPF et al. (2004) for a detailed description of the construction of real consumption.

[11] Exchange rate 1US$ = 25,000 Meticais or 1Metical = 0.00004 US$.

[12] In the sample, there are a few cases of people, who suffered more than one offense. They are however so few that they do not affect our overall results. In this paper we focus on whether people were victimized or not.

[13] We tried several different 'cut-off' values for the relative loss (i.e. only using observations with relative loss less than 10, 30 or 50% of yearly income). All estimations produced results very similar to using the full sample.

[14] A full set of regressions is available upon request.

[15] Our specification was modified so log of household income is relied on here due to the fact that we were unsuccessful in generating appropriate starting values for the IV-probit for the full household level specification.. We therefore report in Table 10 the corresponding standard probit and OLS results for comparison.

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APPENDIX

The sociological categories in the routine activity framework are defined as follows (Cohen *et al.*, 1981):

a) Exposure

   The physical visibility and accessibility of persons or objects to potential offenders at any given time or place.

b) Proximity

   The physical distance between areas where potential targets of crime reside and areas where relatively large populations of potential offenders are found.

c) Guardianship

The effectiveness of persons or objects in preventing violations from occurring, either by their presence alone or by some sort of direct or indirect action.

d) Target Attractiveness

The material or symbolic desirability of persons or property targets to potential offenders, as well as the perceived inertia of target against illegal treatment.

e) Properties of Crimes

The features of specific crimes that act to constrain strictly instrumental actions by potential offenders. For example, many larcenies are less difficult to commit and require less knowledge of victim routine activities than do burglaries.

Table 1: List of Variables by Sociological Category

Group	Variables	Exposure	Guardianship	Proximity	Attractiveness
Individual	Individual Income				x
	Gender	x			
	Age	x			
	Education			x	
	Employment status	x			
	Marital status	x			
Household	Household Income				x
	HH gender	x			
	HH age	x			
	HH Education			x	
	HH Employment status	x			
	Members in Household		x		
	Family Composition		x		
	Possessions: Durable goods				x
	Distance to police station		x		
Community	Unemployment rate			x	
	Distribution of Income: Inequality			x	
	Average level of educational attainment			x	
	Population density			x	
	Integration			x	

Note: All regressions in the econometric analysis also include regional and urban/rural dummies as community variables.

Table 2: Victimization statistics

Type of crime	Percent
A. Purse snatching	6.2
B. Tried or took an object of value	3.4
C. Robbed of a bicycle	4.1
D. Robbed of any type of vehicle	0.3
E. Cattle stolen	5.5
F. Victim of other theft	47.7
G. Victim of rape	0.4
H. Insult or offensive	7.3
I. Threats	1.8
J. Assault	2.7
K. Sexual abuse	0.3
L. Domestic Violence	1.4
M. Bribery	0.5
N. Other	18.5
Total	100

Locality of crime	Percent
At home	66.9
On roads	8.9
In public transport	1.6
In the market	3.2
At work	3.2
In places of leisure	1.2
Other	14.9
Total	100

Table 3: Summary statistics

		Individual		HH	
Group	Variable	Mean	Std. Dev.	Mean	Std. Dev.
	Victim	0.090	0.287	0.275	0.447
	Burglary	0.057	0.231		
	Assault	0.013	0.112		
	Larceny	0.028	0.165		
Individual	Individual Income (monthly)	0.927	7.402		
	Gender	0.530	0.499		
	Age	30.981	16.394		
	Education: Educ0	0.238	0.426		
	Education: Educ1	0.380	0.485		
	Education: Educ2	0.210	0.407		
	Education: Educ3	0.111	0.315		
	Education: Educ4	0.060	0.238		
	Employment status: Employed	0.219	0.414		
	Employment status: Studying	0.657	0.475		
	Employment status: Unemployed	0.124	0.330		
	Marital status: Single	0.374	0.484		
	Marital status: Married	0.104	0.305		
	Marital status: Married Polygam	0.070	0.255		
	Marital status: Cohabit	0.336	0.472		
	Marital status: Divorced	0.060	0.238		
	Marital status: Widow	0.056	0.229		
Household	HH income (yearly)			14.485	33.860
	HH gender	0.228	0.420	0.264	0.441
	HH age	45.280	14.478	43.114	15.177
	HH education 0	0.227	0.419	0.259	0.438
	HH education 1	0.349	0.477	0.358	0.479
	HH education 2	0.214	0.410	0.193	0.395
	HH education 3	0.108	0.310	0.101	0.301
	HH education 4	0.103	0.304	0.089	0.285
	HH employment status	0.926	0.262	0.939	0.239
	Household size	6.439	3.455	5.090	2.799
	Adultmale share	0.246	0.172	0.249	0.208
	Possession of durable goods: TV	0.183	0.387	0.130	0.336
	Possession of durable goods: Radio	0.557	0.497	0.505	0.500
	Possession of durable goods: Bicycle	0.288	0.453	0.265	0.441
	Distance to police station 1	0.472	0.499	0.410	0.492
	Distance to police station 2	0.134	0.340	0.137	0.344
	Distance to police station 3	0.078	0.268	0.084	0.277
	Distance to police station 4	0.082	0.274	0.095	0.294
	Distance to police station 5	0.234	0.424	0.274	0.446
Community	Unemployment rate	0.164	0.142	0.143	0.133
	Distribution of income: Inequality	0.394	0.097	0.386	0.100
	Average level of educational attainment	1.453	0.588	1.380	0.577
	Population density	1.278	3.639	0.942	3.069
	Integration	0.018	0.006	0.017	0.006
N	Total observations	24752		7739	

Table 4: Probit results, marginal effects: Victimization

		Total Individual		Ind. positive income		Total HH	
Group	Variable	Mean	*t*-stats	Mean	*t*-stats	Mean	*t*-stats
Individual	Individual Income (x1000)	1.248**	(2.48)	2.297***	(2.82)		
	Individual Income squared (x1000)	-0.003	(1.60)	-0.005**	(1.97)		
	Gender	-0.056***	(10.02)	-0.066***	(4.22)		
	Age	0.002***	(8.77)	0.004***	(6.10)		
	Education: Educ1	0.028***	(4.16)	0.044**	(2.03)		
	Education: Educ2	0.041***	(3.87)	0.091***	(3.00)		
	Education: Educ3	0.042***	(3.07)	0.047	(1.19)		
	Education: Educ4	0.057***	(3.09)	0.036	(0.89)		
	Employment status: Studying	-0.027**	(2.56)	0.020	(0.39)		
	Employment status: Unemployed	-0.024***	(3.54)	-0.042	(1.37)		
	Marital status: Married	0.081***	(6.61)	0.063**	(2.21)		
	Marital status: Married polygam	0.123***	(8.05)	0.090***	(2.69)		
	Marital status: Cohabit	0.086***	(8.82)	0.087***	(3.64)		
	Marital status: Divorced	0.143***	(7.13)	0.113***	(3.31)		
	Marital status: Widow	0.138***	(6.34)	0.133***	(3.48)		
Household	HH Income (x1000)					2.398***	(4.29)
	HH Income squared (x1000)					-0.003***	(3.01)
	HH Gender	0.043***	(5.33)	0.081***	(3.52)	0.052**	(2.46)
	HH Age	-0.001***	(7.43)	-0.004***	(6.30)	-0.001	(1.05)
	HH Education 1	-0.004	(0.61)	0.010	(0.47)	0.056***	(2.73)
	HH Education 2	0.008	(0.99)	-0.007	(0.28)	0.108***	(4.13)
	HH Education 3	-0.005	(0.47)	-0.013	(0.38)	0.044	(1.57)
	HH Education 4	0.001	(0.08)	0.026	(0.73)	0.049	(1.41)
	HH Employment status	-0.013	(1.63)	-0.013	(0.51)	0.014	(0.53)
	Household size	-0.004***	(5.03)	-0.005**	(2.38)	0.010***	(3.25)
	Adult male share	-0.036**	(2.50)	-0.038	(1.05)	0.015	(0.32)
	Possession of durable goods: TV	0.005	(0.64)	0.008	(0.43)	0.012	(0.37)
	Possession of durable goods: Radio	-0.006	(1.34)	-0.008	(0.63)	-0.016	(0.94)
	Possession of durable goods: Bicycle	0.009*	(1.80)	0.022	(1.55)	0.032*	(1.79)
	Distance to police station 2	0.005	(0.62)	0.040*	(1.66)	0.047	(1.45)
	Distance to police station 3	-0.006	(0.44)	0.010	(0.30)	-0.026	(0.53)
	Distance to police station 4	-0.016	(1.59)	-0.015	(0.55)	-0.039	(1.02)
	Distance to police station 5	-0.022***	(2.63)	-0.024	(1.13)	-0.062**	(2.02)
Community	Unemployment rate	0.115	(1.63)	0.089	(0.47)	0.325	(1.30)
	Distribution of Income: Inequality	0.087**	(2.07)	0.191*	(1.80)	0.181	(1.21)
	Average level of educational attainment	-0.003	(0.25)	-0.004	(0.13)	0.001	(0.03)
	Population density	0.001	(0.82)	0.003	(1.13)	0.005	(1.33)
	Integration	-0.697	(1.27)	-0.949	(0.71)	-1.594	(0.82)
	Observations	24752		9934		7739	
	Pseudo R-squared	0.15		0.06		0.04	

Note: Base: Individual male, individual no education, individual employed, individual single, household head male, household head no education, distance to police station 1, Maputo. *, **, *** indicates significance at a 10%, 5% and 1% level, respectively. All regressions include a constant and regional and urban/rural dummies.

Table 5: Probit results, marginal effects: Burglary, assault and larceny

		Burglary		Assault		Larceny	
Group	Variable	Mean	*t*-stats	Mean	*t*-stats	Mean	*t*-stats
Individual	Individual Income (x1000)	0.964***	(3.51)	0.129**	(1.97)	0.149	(1.36)
	Individual Income squared (x1000)	-0.003***	(2.98)	-0.000	(1.15)	-0.000	(0.85)
	Gender	-0.029***	(8.08)	-0.002*	(1.78)	-0.016***	(8.30)
	Age	0.001***	(9.20)	-0.000	(0.01)	0.000***	(4.58)
	Education: Educ1	0.020***	(4.31)	-0.000	(0.23)	0.009***	(3.28)
	Education: Educ2	0.033***	(3.91)	-0.000	(0.07)	0.009**	(2.43)
	Education: Educ3	0.024**	(1.98)	-0.000	(0.17)	0.012**	(2.26)
	Education: Educ4	0.046***	(2.92)	-0.001	(0.37)	0.015*	(1.92)
	Employment status: Studying	-0.013**	(2.10)	-0.004	(1.54)	-0.003	(0.61)
	Employment status: Unemployed	-0.012**	(2.54)	-0.003*	(1.73)	-0.006**	(2.10)
	Marital status: Married	0.052***	(5.40)	0.003	(0.83)	0.018***	(2.93)
	Marital status: Married polygam	0.073***	(6.12)	0.012***	(2.80)	0.030***	(3.73)
	Marital status: Cohabit	0.046***	(6.46)	0.009***	(2.95)	0.024***	(4.61)
	Marital status: Divorced	0.057***	(4.80)	0.037***	(3.83)	0.041***	(3.77)
	Marital status: Widow	0.065***	(4.73)	0.014**	(2.18)	0.055***	(3.77)
Household	HH Gender	0.021***	(3.84)	0.004*	(1.89)	0.013***	(4.09)
	HH Age	-0.001***	(6.53)	-0.000**	(2.31)	-0.000***	(4.41)
	HH Education 1	-0.007	(1.55)	0.001	(0.59)	-0.000	(0.14)
	HH Education 2	-0.002	(0.30)	0.006***	(2.56)	0.004	(1.35)
	HH Education 3	-0.010	(1.33)	0.002	(0.72)	0.003	(0.68)
	HH Education 4	-0.011	(1.43)	0.013*	(1.72)	0.001	(0.13)
	HH Employment status	-0.011**	(2.14)	0.000	(0.20)	-0.003	(0.81)
	Household size	-0.002***	(3.89)	-0.001***	(2.60)	-0.001***	(3.53)
	Adult male share	-0.028***	(2.68)	0.002	(0.44)	-0.001	(0.11)
	Possession of durable goods: TV	0.001	(0.28)	-0.003*	(1.91)	0.006	(1.49)
	Possession of durable goods: Radio	-0.003	(1.13)	-0.002*	(1.76)	0.000	(0.04)
	Possession of durable goods: Bicycle	0.005	(1.34)	0.003**	(2.34)	-0.000	(0.02)
	Distance to police station 2	-0.001	(0.19)	-0.003**	(2.32)	0.008**	(2.26)
	Distance to police station 3	-0.002	(0.26)	-0.001	(0.64)	0.003	(0.76)
	Distance to police station 4	-0.010	(1.55)	-0.004*	(1.87)	0.000	(0.04)
	Distance to police station 5	-0.019***	(3.35)	-0.003	(1.41)	0.004	(1.12)
Community	Unemployment rate	0.056	(1.21)	0.039***	(3.02)	0.032	(1.11)
	Distribution of income: Inequality	0.037	(1.23)	0.005	(0.70)	0.036**	(2.45)
	Average level of educational attainment	-0.007	(0.80)	-0.000	(0.05)	0.003	(0.63)
	Population density	0.001**	(2.02)	-0.000	(0.28)	-0.001*	(1.64)
	Integration	-0.532	(1.32)	0.064	(0.57)	-0.116	(0.33)
	Observations	24752		24752		24752	
	Pseudo R-squared	0.15		0.13		0.17	

Note: Base: Individual male, individual no education, individual employed, individual single, household head male, household head no education, distance to police station 1, Maputo. *, **, *** indicates significance at a 10%, 5% and 1% level, respectively. All regressions include a constant and regional and urban/rural dummies.

Table 6: Loss from victimization

	Heckman		OLS	
	Coefficient	*t*-statistics	Coefficient	*t*-statistics
HH Income (x10)	-0.221***	(6.26)	-0.166***	(4.83)
HH Income squared (x100)	0.003***	(4.58)	0.002***	(3.62)
HH Gender	0.081	(0.65)	0.168	(1.41)
HH Age	0.004	(1.16)	0.004	(1.20)
HH Education 1	-0.257**	(2.14)	-0.159	(1.37)
HH Education 2	-0.051	(0.36)	0.171	(1.35)
HH Education 3	0.163	(0.99)	0.282*	(1.73)
HH Education 4	0.077	(0.27)	0.206	(0.82)
HH Employment status	-0.004	(0.02)	0.007	(0.04)
Household size	-0.053***	(3.24)	-0.037**	(2.32)
Adult male share	0.342	(1.10)	0.343	(1.27)
Possession of durable goods: TV	0.311*	(1.83)	0.308**	(2.05)
Possession of durable goods: Radio	-0.009	(0.09)	0.002	(0.02)
Possession of durable goods: Bicycle	0.040	(0.39)	0.080	(0.87)
Rho	-0.598***	(4.22)		
Sigma	1.601***	(6.90)		
Total observations	1920 uncensored (7739)		1920	

Note: Test for dependence between regression equation and selection equation; H0: rho=0, Chi2(1)=17.8, Prob>Chi2=0.000. The coefficient estimates for the selection equation are not shown. Due to identical specification they are very close to the estimates reported for the household level probit in Table 4.

Table 7: Estimates (marginal effects) for respectively the logit and the linear probability model

		Logit		Linear Probability Model	
Group	Variable	Mean	*t*-stats	Mean	*t*-stats
Individual	Individual Income (x1000)	0.905**	(2.39)	3.622***	(3.17)
	Individual Income squared (x1000)	-0.002*	(1.65)	-0.007***	(3.08)
	Gender	-0.050***	(9.72)	-0.065***	(10.54)
	Age	0.001***	(8.19)	0.002***	(7.26)
	Education: Educ1	0.026***	(4.00)	0.037***	(5.28)
	Education: Educ2	0.034***	(3.04)	0.051***	(5.52)
	Education: Educ3	0.031**	(2.05)	0.045***	(4.49)
	Education: Educ4	0.039*	(1.90)	0.072***	(5.07)
	Employment status: Studying	-0.027***	(2.94)	-0.024***	(3.80)
	Employment status: Unemployed	-0.022***	(4.49)	-0.027***	(3.87)
	Marital status: Married	0.087***	(4.71)	0.045***	(4.37)
	Marital status: Married polygam	0.128***	(4.89)	0.076***	(5.94)
	Marital status: Cohabit	0.086***	(6.35)	0.066***	(8.23)
	Marital status: Divorced	0.152***	(4.23)	0.103***	(5.65)
	Marital status: Widow	0.148***	(3.83)	0.100***	(4.98)
Household	HH Gender	0.039***	(4.93)	0.029***	(4.23)
	HH Age	-0.001***	(7.56)	-0.001***	(7.03)
	HH Education 1	-0.004	(0.81)	0.0018915	(0.31)
	HH Education 2	0.006	(0.84)	0.015**	(2.02)
	HH Education 3	-0.003	(0.33)	-0.002	(0.21)
	HH Education 4	0.005	(0.33)	0.001	(0.07)
	HH Employment status	-0.014*	(1.68)	-0.003	(0.42)
	Household size	-0.004***	(4.95)	-0.005***	(4.99)
	Adult male share	-0.033***	(2.57)	-0.061***	(2.88)
	Possession of durable goods: TV	0.006	(0.76)	0.003	(0.34)
	Possession of durable goods: Radio	-0.005	(1.14)	-0.008	(1.29)
	Possession of durable goods: Bicycle	0.007*	(1.67)	0.012*	(1.88)
	Distance to police station 2	0.006	(0.89)	0.010	(0.91)
	Distance to police station 3	-0.004	(0.38)	-0.005	(0.27)
	Distance to police station 4	-0.012	(1.58)	-0.020	(1.32)
	Distance to police station 5	-0.017**	(2.53)	-0.026**	(2.21)
Community	Unemployment rate	0.082	(1.34)	0.132	(1.51)
	Distribution of income: Inequality	0.070**	(2.02)	0.134**	(2.08)
	Average level of educational attainment	-0.001	(0.15)	-0.007	(0.49)
	Population density	0.001	(0.95)	0.001	(0.93)
	Integration	-0.572	(1.22)	-1.074	(1.42)
	Observations	24752		24752	
	Pseudo R-squared	0.15		0.08	

Note: See Table 4 for details

Table 8: Sensitivity analysis: Summary statistics

		1	2	3	4	5	6	7	8
Group	Variable	Max	Min	Mean	AvgSTD	PercSigni	Perc+	Perc-	AvgT
Individual	Individual Income	0.013	0.010	0.011	0.004	1	1	0	2.587
	Individual Income squared	0.000	0.000	0.000	0.000	0	0	1	1.662
	Gender	-0.462	-0.479	-0.474	0.048	1	0	1	9.957
	Age	0.015	0.014	0.015	0.002	1	1	0	8.652
	Education: Educ1	0.245	0.225	0.238	0.058	1	1	0	4.128
	Education: Educ2	0.319	0.294	0.306	0.079	1	1	0	3.893
	Education: Educ3	0.340	0.291	0.308	0.099	1	1	0	3.122
	Education: Educ4	0.417	0.367	0.388	0.124	1	1	0	3.117
	Employment status: Studying	-0.259	-0.290	-0.270	0.108	1	0	1	2.507
	Employment status: Unemployed	-0.211	-0.245	-0.234	0.070	1	0	1	3.352
	Marital status: Married	0.541	0.514	0.525	0.080	1	1	0	6.552
	Marital status: Polygamist	0.767	0.682	0.702	0.086	1	1	0	8.211
	Marital status: Cohabit	0.648	0.622	0.630	0.072	1	1	0	8.791
	Marital status: Divorced	0.818	0.745	0.765	0.111	1	1	0	6.903
	Marital status: Widow	0.750	0.723	0.738	0.118	1	1	0	6.258
Household	HH Gender	0.345	0.315	0.328	0.060	1	1	0	5.436
	HH Age	-0.013	-0.013	-0.013	0.002	1	0	1	7.371
	HH Education 1	-0.003	-0.047	-0.034	0.056	0	0	1	0.601
	HH Education 2	0.101	0.059	0.079	0.071	0	1	0	1.111
	HH Education 3	0.027	-0.057	-0.023	0.098	0	0.09	0.91	0.252
	HH Education 4	0.115	-0.008	0.037	0.127	0	0.99	0.01	0.289
	HH Employment status	-0.083	-0.123	-0.113	0.066	0	0	1	1.713
	Household size	-0.032	-0.038	-0.035	0.007	1	0	1	4.853
	Adult male share	-0.297	-0.363	-0.314	0.128	1	0	1	2.459
	Possession of durable goods: TV	0.075	-6.491	-0.773	1.026	0	0.80	0.20	0.785
	Possession of durable goods: Radio	-0.031	-0.053	-0.042	0.039	0	0	1	1.077
	Possession of durable goods: Bicycle	0.078	0.027	0.066	0.043	0	1	0	1.535
	Distance to police station 2	0.116	0.024	0.081	0.071	0	1	0	1.142
	Distance to police station 3	0.058	-0.087	0.003	0.107	0	0.58	0.42	0.341
	Distance to police station 4	-0.010	-0.182	-0.091	0.085	0	0	1	1.036
	Distance to police station 5	-0.112	-0.216	-0.158	0.062	0.94	0	1	2.524
Community	Unemployment rate	1.463	0.793	1.130	0.592	0.29	1	0	1.916
	Distribution of income: Inequality	0.861	0.560	0.729	0.350	0.66	1	0	2.091
	Average level of educational attainment	0.181	-0.065	0.075	0.088	0.08	0.83	0.17	0.949
	Population density	0.015	0.003	0.009	0.007	0.29	1	0	1.443
	Integration	-1.682	-6.995	-4.760	4.991	0	0	1	0.953

Note: See Table 4 for details.

Table 9: Selection sensitivity analysis: Summary statistics

	1	2	3	4	5	6	7	8
Variable	Max	Min	Mean	AvgSTD	PercSigni	Perc+	Perc-	AvgT
Household income (x10)	-0.174	-0.229	-0.203	0.035	1	0	1	5.81
Household income squared (x100)	0.003	0.002	0.003	0.001	1	1	0	4.25
Household size	-0.036	-0.065	-0.052	0.016	1	0	1	3.27

Note: PercSigni refers to percentage significant at 5 percent. 2047 regressions. Selection equation as specified in Table 4.

Table 10: IV estimations: IV-probit and 2SLS

	Probit		IV Probit		OLS		2SLS	
	Mean	*t*-statistics	Mean	*t*-statistics	Mean	*t*-statistics	Mean	*t*-statistics
HH Income (log)	0.217***	(5.52)	0.436**	(1.98)	0.075***	(5.74)	0.139*	(1.85)
HH Gender	0.144**	(2.28)	0.085	(1.14)	0.042**	(2.02)	0.030	(1.25)
HH Age	-0.002	(1.19)	-0.002	(1.18)	-0.000	(0.97)	-0.001	(1.14)
HH Education 1	0.163**	(2.55)	0.144**	(2.16)	0.048**	(2.44)	0.043**	(2.16)
HH Education 2	0.299***	(3.88)	0.284***	(2.99)	0.099***	(3.70)	0.090***	(2.92)
HH Education 3	0.097	(1.14)	0.059	(0.46)	0.038	(1.21)	0.017	(0.39)
HH Education 4	0.104	(0.98)	0.010	(0.04)	0.050	(1.16)	0.005	(0.06)
HH Employment status	0.046	(0.54)	0.028	(0.31)	0.009	(0.30)	0.008	(0.26)
Household size	0.043***	(4.46)	0.069***	(2.75)	0.015***	(4.45)	0.022**	(2.53)
Adult male share	-0.003	(0.02)	-0.158	(0.75)	0.002	(0.04)	-0.042	(0.61)
Possession of durable goods: TV	-0.015	(0.15)	-0.188	(1.11)	-0.008	(0.21)	-0.055	(0.98)
Possession of durable goods: Radio	-0.070	(1.31)	-0.105	(1.59)	-0.024	(1.33)	-0.033	(1.48)
Possession of durable goods: Bicycle	0.073	(1.32)	0.034	(0.39)	0.027	(1.38)	0.012	(0.43)
Distance to police station 2	0.153	(1.54)	0.152	(1.39)	0.040	(1.15)	0.049	(1.31)
Distance to police station 3	-0.066	(0.43)	-0.007	(0.04)	-0.018	(0.35)	-0.006	(0.11)
Distance to police station 4	-0.101	(0.84)	-0.079	(0.60)	-0.040	(1.05)	-0.026	(0.64)
Distance to police station 5	-0.183*	(1.92)	-0.162	(1.51)	-0.062*	(1.87)	-0.053	(1.51)
Unemployment rate	1.018	(1.32)	1.121	(1.44)	0.278	(1.10)	0.312	(1.30)
Distribution of Income: Inequality	0.649	(1.37)	0.764	(1.49)	0.297*	(1.72)	0.273	(1.60)
Average level of educational attainment	-0.021	(0.17)	-0.039	(0.30)	-0.001	(0.03)	-0.012	(0.29)
Population density	0.014	(1.24)	0.016	(1.48)	0.006	(1.46)	0.006	(1.51)
Integration	-3.371	(0.55)	-1.111	(0.15)	-1.171	(0.54)	-0.315	(0.13)
Observations	7739		7739		7739		7739	
Sigma			-0.616***	(33.49)				
Rho			-0.114	(0.89)				
Wald test for exogeneity			0.79 (0.38)					
F(First-stage)							38.75	
Hansen J-statistic for overidentification							0.17	

Note: Base: Household head male, household head no education, distance to police station 1, Maputo. All regressions include a constant and regional and urban/rural dummies. We use a cluster-robust optimal weighting matrix: all t-values (reported in parenthesis) are fully robust with respect to arbitrary heteroscedasticity and arbitrary intra-country (intra-cluster) correlation; *, **, *** indicate significance at a 10%, 5% and 1% level, respectively. All regressions included a constant term. The IV probit and 2SLS treat HH income as endogenous and external instruments used are: (i) the number of rooms in the main premises and ii) a dummy for whether the house is build by bricks. Hansen's J statistic is a test for overidentifying restrictions. The test of excluded instruments is a F-test of exclusion of the instruments from the first-stage regression.